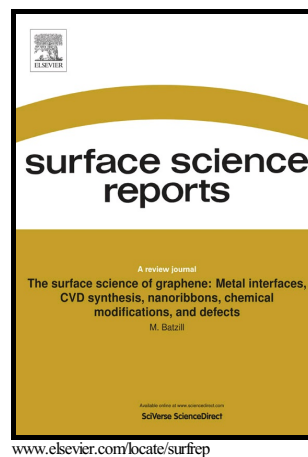


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Surface chemistry of carbon dioxide revisited

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Abstract

This review discusses modern developments in CO₂ surface chemistry by focusing on the work published since the original review by H. J. Freund and M.W. Roberts two decades ago (*Surface Science Reports* 25 (1996) 225-273). It includes relevant fundamentals pertaining to the topics covered in that earlier review, such as conventional metal and metal oxide surfaces and CO₂ interactions thereon. While UHV spectroscopy has routinely been applied for CO₂ gas-solid interface analysis, the present work goes further by describing surface-CO₂ interactions under elevated CO₂ pressure on non-oxide surfaces, such as zeolites, sulfides, carbides and nitrides. Furthermore, it describes salient *in situ* techniques relevant to the resolution of the interfacial chemistry of CO₂, notably infrared spectroscopy and state-of-the-art theoretical methods, currently used in the resolution of solid and soluble carbonate species in liquid-water vapor, liquid-solid and liquid-liquid interfaces. These techniques are directly relevant to fundamental, natural and technological settings, such as heterogeneous and environmental catalysis and CO₂ sequestration.

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